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Abstract

Objective: The aim of this study was to develop and validate a new questionnaire designed to measure carer attitudes and behaviours that, according to the cognitive interpersonal maintenance model ¹, can cause anorexia nervosa to persist. **Method:** The Carer Skills (CASK) was developed by a group of clinicians and carers. Preliminary versions of the scale devised for both carers and parents were given at baseline and at follow up after two studies of carer interventions (a clinical trial of the effectiveness of guided self-help and training workshops). Explorative and confirmative factor analysis (CFA) was used to test the factorial structure of the CASK. Cronbach's alpha was used to measure internal consistency of the CASK scales. **Results:** Exploratory Factor Analysis suggested a six component solution (Bigger Picture, Self-Care, Terrier- Lite, Acceptance, Emotional Intelligence and Frustration Tolerance) and this model was confirmed with CFA. Significant clinically relevant correlations were found between the CASK scales, and other standardised measures of carers' attitudes and behaviours such as; expressed emotion (Family Questionnaire), accommodation and enabling (Accommodation and Enabling Scale for Eating Disorders), general health (General Health Questionnaire) and overall distress (Depression Anxiety and Stress Scale). Furthermore, greater improvements on abilities measured by CASK were found in care givers who received skills-training than carers assigned to a 'treatments as usual' condition. **Discussion:** The CASK scale has the potential to measure carer attitudes and behaviour that maintain eating disorder symptoms. It can be used as an outcome measure to examine the impact of carer interventions.

Keywords: Carer, Eating Disorders, Exploratory Factor Analysis, Anorexia Nervosa,

Development and validation of a scale to measure Carer Skills (CASK) in eating disorders.

Eating disorders (EDs), particularly anorexia nervosa (AN), have a large impact on psychosocial functioning. Schmidt and Treasure (2006) developed a cognitive interpersonal maintenance model describing how the illness can progress with a variety of secondary consequences². The evidence supporting this model has been recently synthesised¹ and also a stage based construct of eating disorders has been developed (ref). The interpersonal component of the model posits that the carers' emotional and behavioural reactions (criticism, hostility, over protection and accommodation) to the ED symptoms and secondary changes in social cognitive functioning of the individual may allow the illness to persist¹. The model has led to the development of a form of treatment for individuals with AN themselves, (The Maudsley Model of Anorexia Nervosa Treatment for Adults [MANTRA]) which targets the various elements of the model³ and also interventions for carers themselves targeting the interpersonal components of the model (Experienced Carers Helping Others [ECHO])⁴.

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A recent systematic review has documented the variety of parenting/psychoeducational interventions have been developed for carers of people with ED⁵. The outcomes from these have been measured with instruments that assess general carer self-efficacy⁶, expressed emotion⁷, caregiver burden⁸ and accommodating and enabling behaviours⁹. We have developed an assessment measure (the Carer Skills [CASK]) of the specific skills and knowledge taught within interventions based on the cognitive interpersonal maintenance model in order to assess treatment fidelity. The CASK was developed by compiling questions pertaining to items of core knowledge contained within ECHO. This was

further refined by asking clinicians and experienced coaches to read through the initial prototypes and provide feedback.

The purpose of the present study was to undertake three aims: (1) to develop and examine the factor structure and internal consistencies of the new scale, (2) to examine whether these attitudes and behaviours are associated with other aspects of care giving behaviour, (3) to examine whether the instrument is responsive to change and whether carers can be taught key skills from a psychoeducational intervention (ECHO).

Hypotheses

1. The new scale will have factors which match the curriculum of ECHO intervention.
2. CASK scores will correlate negatively with care giving factors such as depression and anxiety, low general wellbeing, expressed emotion and accommodation /enabling behaviours.
3. Interventions with a larger interpersonal input such as "guidance" will show greater improvements than self-help alone or "treatment as usual".

METHODS

Design

Carers were asked to complete the new assessment measure as part of a battery of assessment measures. The same measures were used after the various types of intervention were given.

Sample

Data for the validation of this instrument were collected from a variety of participants involved in carer work. These included: (1) Carers (N=198) who took part in the baseline assessment of a multi-centre controlled trial (RCT) evaluating a skills-based intervention for carers of someone with AN (Experienced Carers Helping Others [ECHO])⁴. Ethical approval was granted by the National Research Ethics Service Committee (11/H0724/4); (2) Data collected from carers attending the National Carers Conference, carer workshops, the volunteer database at Guy's Hospital, the Beat volunteer database and from the community through poster advertisement (N = 127). The collection of these questionnaires was approved by the local research ethics committee. See Table 1 for participant demographics.

Data examining responsiveness to change included: (1) Carers (N = 136) who were followed up at 6-month post-intervention (N = 44: skills training book¹⁰ and five DVDs [ECHO], N = 49: carers received the aforementioned self-help materials and an additional five coaching sessions with an 'experienced carer' [ECHOc], N = 43: treatment as usual only [TAU]). (2) Carers (N= 47) who were assessed immediately after a one-day (6 hour) psychoeducational workshop.

INSERT TABLE 1 NEAR HERE

Measures

In addition to the CASK, this study employed:

The Depression Anxiety and Stress Scale (DASS-21)¹¹ is a 21-item self-report measure validated in both clinical and non-clinical samples with good internal reliability.

The General Health Questionnaire (GHQ) ¹² is a well-validated 12-item measure assessing general wellbeing over the previous few weeks using a 4-point Likert scale.

The Family Questionnaire (FQ) ⁷ is a 20-item self-report measure of expressed emotion in carers. Scores are given on a 4-point Likert scale. Two subscales: emotional over-involvement and criticism. Good internal consistency for emotional over-involvement (0.78-0.80) and criticism (0.91-0.92).

The Accommodation and Enabling Scale for Eating Disorders (AESED). ⁹ is a 33-item self-report measure. Internal consistency for the scale is good (.77-.90 for subscales, .92 for total scale).

The development of the assessment measure CASK (Item pool generation)

A group of experienced clinicians and researchers working at the Institute of Psychiatry in London generated items targeting carers' knowledge about the skills that are helpful in managing ED behaviours. Items were drawn from a collaborative care model ¹³ and included the core skills and values taught in the clinical guide ¹⁰. These included: communication about emotions and ED symptoms with family, friends and the individual; a compassionate caring stance to self and other family members and the individual with an ED; hope and positive framing; a motivational interviewing form of communication including; affirmation, sidestepping arguments and yet gentle firmness on boundaries and non-negotiable rules; keeping a focus on the bigger picture and away from too much focus on detail of eating behaviour; accepting the illness and not blaming self or individual; quality time for self and other members of the family; and emotional regulation. This was further

refined by asking clinicians and experienced coaches to read through the initial prototypes and provide feedback. Face and content validity were considered as items were included. In total, 33 items were generated for the pilot scale. Each item was scored with a visual analogue scale, with anchors 0 and 100 and decile points and adjectives.

Statistical Analysis

In the first stage, the following analyses were conducted to test the psychometric properties of the CASK. Exploratory factor analysis (EFA) with principal-axis factoring as an extraction method was used to examine the number of factors underlying the data. As factors were assumed to be highly correlated, an oblique rotation method (direct oblimin) was used¹⁴. Factorability was assessed through the Kaiser-Meyer-Olkin Index (KMO) test¹⁵ and the Bartlett's test of sphericity. A combination of methods was used for factor retention, including Kaiser's criteria (retention of factors with eigenvalues > 1.0), a close examination of the scree test (examination of a plot of the eigenvalues for breaks or discontinuities), factor interpretability and theoretical relevance. To determine item inclusion in a factor, factor loadings above .30 were considered acceptable¹⁶.

Using EQS 6.1¹⁷, confirmatory factor analysis (CFA) was carried out on CASK to confirm the factors determined in the EFA. The model tested used maximum likelihood estimation (ML). The following indexes were used to evaluate the overall goodness model fit: the Satorra-Bentler robust χ^2 test statistics (S-B χ^2 /df ratios < 3 indicate reasonable fitting models), the robust comparative fit index (CFI, with values .90 or over indicating better fitting models) and the root-mean-square error of approximation (RMSEA, with values of .05 or less indicating close fit, as well as values <.08 is indicative of reasonable fit)¹⁸. The

internal consistency between items within each retrieved factor was determined by calculating Cronbach's alpha. Convergent validity was established by correlating all six sub-domains and total score of the CASK with standardised measures of carers' expressed emotions (FQ), accommodation and enabling (AESED), general health (GHQ) and distress (DASS). Analyses were conducted using Spearman's correlation coefficient and version 17.0 of PASW.

In the second stage, the following analyses were conducted to test the sensitivity of the CASK (N = 183). Responsiveness to change was evaluated by administering the questionnaire at two time points, pre and post intervention. ECHO carers (N = 136) were assessed at 6 month follow-up post-self-help intervention. Workshop carers (N = 47) were assessed immediately after a one-day workshop. Wilcoxon's signed-ranks test for paired samples was used to assess change following the caregiver intervention. Effect sizes were calculated using Cohen's *d* to indicate the magnitude of pre and post differences. Cohen's effect sizes are understood as negligible (≥ -0.15 and < 0.15), small (≥ 0.15 and < 0.40), medium (≥ 0.40 and < 0.75), large (≥ 0.75 and < 1.10), very large (≥ 1.10 and < 1.45) and huge (> 1.45)¹⁹.

RESULTS

Item and descriptive analyses

All of the corrected item-total correlations were higher than 0.40 for the 33 items on the questionnaire. Correlation coefficients ranged from .317 to .833 and achieved statistical significance ($p < 0.001$) indicating good homogeneity among items. In addition, t-tests for extreme groups revealed that all 33 items had t values that reached a level of significance

($p < 0.001$), suggesting that all items yielded good discriminating power. As a result, all questionnaire items were retained for subsequent factor analysis.

Exploratory factor analysis

Exploratory factor analysis (EFA) was performed to examine the latent structure of the 33-items of the CASK and to select relevant items. The Kaiser-Meyer-Olkin Index of sampling adequacy value ($KMO = 0.92$) verified the sampling adequacy for the proposed analysis. Bartlett's test of sphericity (approximate Chi-square = 5,412.247; $p < 0.001$) indicated that correlations between items were sufficiently large for principal-axis factoring.

Examination of Kaiser's criteria and the scree-plot yielded empirical justification for retaining six factors with eigenvalues exceeding 1, explaining 51% of the total amount of accounted variance. Item loadings on the six factors are displayed in Table 2. The final names assigned to each factor were determined by item content. Factor 1, labelled Bigger Picture, comprised nine items and was related to concerns about the ability to be more positive about changes with a hopeful, long view. The eigenvalue of the first factor was 11.26 and accounted for 13.5% of the variance, with the corresponding factor loading ranging from 0.313 to 0.792. Factor 2, labelled Self-Care, comprised four items and was related to concerns about the ability to take time for our self and other family members. The eigenvalues of the second factor was 2.34 and it's explained variance was 6.9%, with the corresponding factor loading ranging from 0.408 to 0.799. Factor 3, labelled Terrier-Lite, comprised three items and was related to concerns about the ability to control the urge to enquire and avoid repetitive nagging conversations. The eigenvalues of the third factor was 2.09 and it's explained variance was 8.2%, with the corresponding factor loading ranging from 0.612 to 0.779. Factor 4, labelled Acceptance, comprised four items and was related to

concerns about the ability to accept and manage negative emotions. The eigenvalue of the fourth factor was 1.55 and its explained variance was 5.8%, with the corresponding factor loading ranging from 0.314 to 0.638. Factor 5, labelled Emotional Intelligence, comprised four items and was related to concerns about the ability to discuss and manage feelings. The eigenvalue of the fifth factor was 1.27 and its explained variance was 5.7%, with the corresponding factor loading ranging from 0.403 to 0.581. Factor six, labelled Frustration Tolerance, comprised six items and was related to concerns about the ability to side step conflict yet be firm, calm and understanding towards the person with the ED. The eigenvalues of the sixth factor was 11.26 and accounted for 13.5% of the variance, with the corresponding factor loading ranging from 0.313 to 0.792.

Two items (CASK 30 and CASK 31) were removed because they did not meet the criteria for inclusion.

INSERT TABLES 2 AND 3 NEAR HERE

The CASK total score and the six derived factors showed statistically significant associations (range from .65 to .84) and the association between the six derived factors ranged from .09 to .60 (Table 3).

Confirmatory factor analysis

Confirmatory factor analysis (CFA) was performed to assess the robustness of the six-factor model derived from EFA. Initial model fit did not meet criteria for good fit ($S-B\chi^2 = 1066.53$; $df=422$; $S-B\chi^2/df = 2.53$; Robus CFI = .840; RMSEA = .07) and items were removed

iteratively to improve fit. An asterisk in Table 2 indicates removed items. The χ^2 value of the model was significant ($S-B\chi^2 = 644.05$; $df=313$; $S-B\chi^2/df = 2.06$; $p<.001$). Examination of other fit indexes indicated an adequate fit between the theoretical model and the data, with Robust CFI=0.90; RMSEA=0.06. All the standardised factor loadings of the items into their correspondent latent construct were statistically significant (at least $p<.05$), ranging between .28 and .84 with a mean of .66.

Internal consistency

Cronbach's alpha was used to determine the internal consistency for the total score and for each of the six derived factors. All of them have high internal consistency: .92 for the total score; .85 for Factor 1; .77 for Factor 2; .77 for Factor 3; .71 for Factor 4; .77 for Factor 5 and .84 for Factor 6. Corrected item-total correlations were in the .30-.66 range for the total CASK, .50-.70 for Factor 1, .48-.66 for Factor 2, .59-.63 for Factor 3, .49-.58, for Factor 4, .37-.63 for Factor 5 and .55-.72 for Factor 6.

Convergent validity

Correlational analysis

The correlations between the scores on each CASK factor and those on the DASS, the AESED, the GHQ and the FQ appear in table 3. The following theoretically predicted correlations were found: (a) carers' expressed emotion (FQ) was negatively associated with CASK Factor 3 – Terrier-Lite ($r = -.366$, $p < .01$), with CASK Factor 4 – Acceptance ($r = -.233$, $p < .01$) and with CASK Factor 6 – Frustration Tolerance ($r = -.464$, $p < .01$); (b) carers'

accommodating and enabling behaviours (AESED) were negatively correlated, although weakly, with CASK Factor 5 – Emotional Intelligence ($r = -.149, p < .05$); and (c) CASK Factor 2 - Self-Care was negatively associated with carers' general health (GHQ, $r = -.609, p < .01$) and with carers' distress (DASS, $r = -.446, p < .01$).

Responsiveness to Change

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At Time 1 ([T1] before treatment), coefficient alpha for the CASK scales were: .918 for the total score; .844 for Factor 1; .780 for Factor 2; .755 for Factor 3; .709 for Factor 4; .771 for Factor 5 and .818 for Factor 6. At Time 2 ([T2] 6 months follow-up post-intervention/immediately after one-day workshop), they were: .940 for the total score; .859 for Factor 1; .815 for Factor 2; .780 for Factor 3; .696 for Factor 4; .705 for Factor 5 and .866 for Factor 6. The 6 months correlation coefficients were as follows: total score $r = .61, p < .01$; Factor 1 – Bigger Picture, $r = .55$; Factor 2 – Self-Care $r = .59, p < .01$; Factor 3 Terrier-Lite $r = .43, p < .01$; Factor 4 – Acceptance $r = .54, p < .01$; Factor 5 – Emotional Intelligence $r = .56, p < .01$; and Factor 6 – Frustration Tolerance $r = .56, p < .01$. To evaluate changes between T1 and T2, caregivers were grouped according to type of treatment they had been allocated to: self-help alone ECHO (N = 44; M = 10; F = 34), guided self-help ECHOc (N = 49; M = 14; F = 35), workshop (N = 47; M = 8; F = 39) and treatment as usual (TAU, n = 43; M = 12; F = 31). Table 4 shows the results of these analyses.

The total score of the CASK showed an improvement after the ECHO intervention with and without coaching and the one-day workshop. The effect size (ES) was small for ECHO without coaching ($ES = -0.31$), large for ECHO with coaching ($ES = -0.77$) and very large after the one-day workshop ($ES = -1.19$). There was no improvement in total score in the TAU group. All six subscales of the CASK showed an improvement in the ECHO intervention group with coaching and one-day workshop with varying effect sizes (see Table 4). Improvements were demonstrated in “Bigger Picture” and “Frustration Tolerance” in the ECHO intervention without coaching and in “Self-Care” and “Frustration Tolerance” in the TAU group.

DISCUSSION

The primary aim of this study was to develop a scale to measure Carer Skills (CASK) that, according to the cognitive interpersonal maintenance model, can be helpful in the support of people with anorexia nervosa. The specification of the CASK was derived by compiling questions pertaining to items of core knowledge contained within the psychoeducational intervention, ECHO. This was further refined by asking clinicians and experienced coaches to read through the initial prototype and provide feedback. Exploratory and confirmatory factor analysis demonstrated strong factorial validity for an instrument with 27 items and six factors: Bigger Picture, Self-Care, Terrier-Lite, Acceptance, Emotional Intelligence and Frustration Tolerance. These factors encapsulate the specific attitudes and behaviour that are common in such families and are consistent with the cognitive interpersonal maintenance model ¹.

The internal consistencies of the six factors were high above the standard of 0.70 set by Nunnally and Bernstein ²⁰ for newly developed research tools. The convergent validity was examined comparing this specific care giving instrument with the non-specific General Health Questionnaire and Depression, Anxiety and Stress Scale. As hypothesised, carer's general health (GHQ) and distress (DASS) were negatively correlated with the Self-Care factor.

The construct validity was examined comparing the CASK with questionnaires specifically associated with care giving: the Family Questionnaire and the Accommodation and Enabling Scale for Eating Disorders. As hypothesised, expressed emotion (FQ) was negatively correlated with the Terrier-Lite factor, the Acceptance factor and the Frustration

Tolerance factor. Additionally, accommodating and enabling behaviour (AESED) was negatively correlated with the Emotional Intelligence factor.

The secondary aim of this study was to examine if the dimensions measured by this instrument might be sensitive to change. As expected, the total score increased significantly after skills-training interventions (ECHO, ECHOc and workshop) aimed at changing intrafamilial maintaining factors. This increase was not demonstrated in the TAU group suggesting that carers can not only be taught key skills from psychoeducational interventions, but that the CASK is sensitive to that change. As hypothesised, the interventions with a greater level of interpersonal training produced the most change and this has implications for the development of future training interventions.

Limitations

There are some limitations that should be noted. Firstly, the results of this study require replication, ideally with a larger and more diverse sample of caregivers. Secondly, sensitivity to change before and after a carers' intervention was measured but in order to test the interpersonal model it would be interesting to examine whether changes in the CASK are associated with changes in patient well-being or symptoms.

The strengths are that we have been able to show sensitivity to carer change in both the short term post workshop and the longer term after 6 months and with different forms of intervention.

Conclusion

This study provides evidence for the factorial and convergent validity and the internal consistency of a 27 item measure of Carer Skills (CASK) related to specific attitudes and behaviours that are common in families of people with an ED. Thus, this instrument may be of value to evaluate the specific needs of families of people with EDs and to tailor family work to these areas. Furthermore, this study has demonstrated the scale's responsiveness to change, highlighting its potential as an outcome measure to examine the impact of carer interventions.

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